CERTIFICATE OF MAILING

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Attorney for Applicant(s)

PATENT APPLICATION
Docket No.: SJO920000145US1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Tsann Lin and Daniele Mauri	)
Serial No.:	Not yet assigned	)
Filing Date:	January 4, 2002	) Group Art Unit:
For:	A SPIN-VALVE SENSOR WITH PINNING LAYERS COMPRISING MULTIPLE ANTIFERROMAGNETIC FILMS	)

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner
for Patents
Washington, D.C. 20231

Sir:

This Information Disclosure Statement discloses information which has come to the attention of applicant and his attorneys and is being submitted so as to comply with the duty of disclosure set forth in 37 C.F.R. § 1.56. In accordance with 37 C.F.R. § 1.97(b), this Statement is being filed within three (3) months of the filing date of the above-identified application or before the mailing date of a first Action on the merits.

Neither applicant nor his attorneys make any representation that any information disclosed herein may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103. Moreover, pursuant to 37 C.F.R. § 1.97, the filing of this Information Disclosure Statement

APPLICATION No. JP11-175919

The first anti-ferromagnetic layer is made of an ordered Mn alloy having a film thickness of 10 to 50 A. The second anti-ferromagnetic layer is made of a disordered Mn alloy having a film thickness of 30 to 100 A. The Mn alloy of the first anti-ferromagnetic layer includes more than one kinds of elements selected from the group of Pt, Ni, Rh, Ru, Au and Pd. The Mn alloy of the second anti-ferromagnetic layer includes more than one kind of elements selected from the group of Pt, Ni, Ir, Rh, Ru, Co, Fe and Pd. It is desirable that the composition of the Mn alloy of the first anti-ferromagnetic layer is Mn 40 to 60 at %. It is also desirable that the composition of the Mn alloy of the second anti-ferromagnetic layer is Mn 50 to 95 at %.

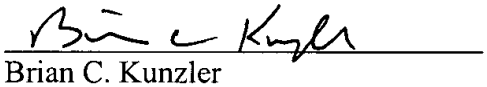
APPLICATION No. JP11-26232

An exchange combination film is formed through such a manner that a base layer 2 of high-melting material, a ferromagnetic film 3 of NiFe alloy or the like, and an antiferromagnetic film 10 of MnPt, FeMn, NiMn alloy or the like are successively formed on a board of glass, Si or the like. At this point, the antiferromagnetic 10 is composed of three antiferromagnetic layers 4, 5, and 6 of different Neel temperatures. The layers 4, 5, and 6 are so arranged as to get lower in Neel temperature with a distance from the ferromagnetic layer 3. The layers 4, 5, and 6 are formed of the same material and set different in Neel temperature by a change in composition. By this setup, an exchange combination film which is restrained from deteriorating in exchange combination magnetic field, even after it is subjected to a thermal treatment and kept high and stable in exchange combination magnetic field, is realized.

APPLICATION No. JP9-50612

This magnetoresistive effect film is produced by successively depositing a buffer layer 12, a magnetic layer 13, antiferromagnetic layers 14, 15, and a protective layer 16 on a substrate 11. As for the antiferromagnetic material, different antiferromagnetic materials are used for respective layer. An Mn-Ir alloy is used for the antiferromagnetic layer 15 which is formed to be not adjacent to the magnetic layer 13, while a Fe-Mn alloy or Ni-Mn alloy is used for the antiferromagnetic layer 14 to be adjacent to the magnetic layer 13. Thereby, a magnetoresistive effect film having excellent heat resistance and corrosion resistance and strong exchange coupling between the magnetic layer 13 and antiferromagnetic layers 14, 15 can be easily produced. As a result, Barkhausen noise of the magnetoresistive effect element can be suppressed.

The switched connection film is provided with antiferromagnetic body films 3, 4 in the composition represented by M (sub 100-x) Mn (sub x) as well as a ferromagnetic body film 2 lamination formed on these antiferromagnetic body films 3, 4 wherein M in the antiferromagnetic body film 3 is at least one kind of element selected from Fe, Co, Pd, Pt while the value of x: 40<x<=60 near the interface of the ferromagnetic body film 2 side by 20<=x<=40 near the opposite side to the interface. Besides, the composition of the antiferromagnetic body film changes within the range of 20<=x<=80 through the film is continuously changes or the composition of the antiferromagnetic body film changes stepwise. Furthermore, an electrode for current supply to at least the antiferromagnetic body film out of these exchange coupled films is formed on a substrate.



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shall not be construed as a representation that a search has been made or as an admission that the information cited herein is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b).

In accordance with 37 C.F.R. § 1.98, this Information Disclosure Statement includes and is accompanied by:

1. A completed copy of Form PTO-1449 listing the patents, publications and other information being submitted for consideration; and
2. A legible copy of each patent, publication and other item of information in written form listed on the enclosed Form PTO-1449.

NON-ENGLISH INFORMATION

Pursuant to 37 C.F.R. § 1.98, following is a concise explanation of the relevance (as it is presently understood by the individual designated in 37 C.F.R. § 1.56(c) most knowledgeable about the content of the information), of each listed patent, publication or other information that is not in the English language. Respectfully submitted,

APPLICATION No. JP11-214767

With a magnetic field applied to in a substrate plane during forming a film, a Cu lower film 21, first FeMn antiferromagnetic film 22, first NiFe ferromagnetic film 23, Cu non-magnetic intermediate layer 24, second NiFe ferromagnetic film 25, second InMn antiferromagnetic film 26 and Ta protective film 27 are formed on a substrate. The blocking temps. of the first and the second antiferromagnetic films 22, 26 are 150 are 250° C respectively. For controlling the magnetizing direction of the second ferromagnetic film 25, it is heat treated in an external magnetic field being applied in a Y-axis direction at 250° C, and for controlling the magnetizing direction of the first ferromagnetic film 23, it is heat treated in a magnetic field being applied in an X-axis direction at 150° C.